

What is claimed is:

1. A precleaner arrangement for separating a portion of entrained material from air flow air entering an engine air cleaner, the precleaner arrangement comprising:
  - (a) a vane structure arrangement including at least a first, adjustable, air deflection vane;
    - (i) the first, adjustable, air deflection vane having a flexible portion deflectable between a first orientation and a second orientation;
    - (ii) the flexible portion having a memory bias toward the first orientation; and,
    - (iii) the flexible portion being configured to deflect toward the second orientation, in response to a sufficient air flow rate increase through the precleaner arrangement, in use.
2. A precleaner arrangement according to claim 1 wherein:
  - (a) the vane structure arrangement comprises a plurality of adjustable air deflection vanes positioned around a central hub;
    - (i) each adjustable air deflection vane having a flexible portion deflectable between a first orientation and a second orientation;
    - (ii) each flexible portion having a memory bias toward a first orientation; and,
    - (iii) each flexible portion being configured to deflect toward the second orientation in response to a sufficient air flow rate increase through the precleaner arrangement, in use.
3. A precleaner arrangement according to claim 2 wherein:
  - (a) each adjustable air deflection vane comprises:
    - (i) a flexible member; and,
    - (ii) a rigid structural member.

4. A precleaner arrangement according to claim 3 wherein:
  - (a) the vane structure arrangement includes at least three adjustable air deflection vanes.
5. A precleaner arrangement according to claim 4 wherein:
  - (a) the vane structure has a first axial total vane length  $X$  and a first vane perimeter size  $Y$ ;
  - (b) the precleaner being configured such  $X < Y$ .
6. A precleaner arrangement according to claim 5 wherein:
$$X < 0.7Y$$
7. A precleaner arrangement according to claim 6 wherein:
$$X < 0.3Y$$
8. A precleaner arrangement according to claim 4 wherein:
  - (a) the vane structure includes a perimeter rim:
    - (i) each adjustable air deflection vane being secured in extension between the central hub and the perimeter rim; and
    - (ii) a perimeter edge portion of each flexible portion being spaced from the perimeter rim, to define a flexible, downstream, outer ear in the associated flexible portion.
9. A precleaner arrangement according to claim 8 wherein:
  - (a) each adjustable air deflection vane has: a lead, upstream, edge; and, a tail, downstream, edge; and
  - (b) the flexible member has a concave upstream surface in extension between the lead edge and the tail edge, when in the first orientation.
10. A precleaner arrangement according to claim 9 having:
  - (a) a projection angle  $A$  between the lead upstream edge of each adjustable air deflection vane and a tail edge of a next adjacent air deflection vane of at least  $17^\circ$ .

11. A precleaner arrangement according to claim 8 wherein:
  - (a) the vane structure arrangement is secured to a perimeter housing structure having a dust drop tube.
12. An air cleaner comprising:
  - (a) a precleaner arrangement comprising a vane structure arrangement including a plurality of adjustable, air deflection vanes;
    - (i) each adjustable air deflection vane having:
      - (A) a flexible member; and,
      - (b) a rigid structural member;
    - (ii) each flexible member being deflectable between a first orientation and a second orientation;
    - (iii) each flexible member having a memory bias toward the first orientation; and
    - (iv) the flexible member being configured to deflect toward the second orientation, in response to a sufficient air flow rate increase through the precleaner arrangement, in use; and
  - (b) a main air cleaner positioned to receive air from the precleaner arrangement;
    - (i) the main air cleaner having a serviceable air filter element therein.
13. An air cleaner arrangement according to claim 12 wherein:
  - (a) the serviceable air filter element comprises z-filter media.
14. A method of operating a precleaner to separate a portion of entrained material from air flow entering an engine air cleaner; the method including steps of:
  - (a) directing air through air deflection vanes of a vane structure of the precleaner at a first flow rate; and
  - (b) increasing air flow from the first flow rate to a second, higher, flow rate while adjusting configuration of selected vanes in the vane

structure by deforming flexible portions of the vanes toward a downstream direction.

15. A method of manufacturing a vane structure arrangement of a precleaner, the method including steps of:
- (a) injecting a first material into a mold arrangement, to form a support structure; and,
  - (b) injecting a second moldable material, into contact with the first material, to form flexible vane portions.